# The sleep of higher education students during the pandemic period

# O sono dos estudantes do ensino superior durante o período pandémico

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## 1 INTRODUCTION

When we talk about academic performance, we are referring to the assessment made on the knowledge acquired at school level. There are several factors that influence school performance and that can lead a student to perform poorly academically, including sleep quality.

The definition of normal sleep is extremely difficult and very subjective, as it varies according to each person's chronobiology (Koo & Kim, 2013). Normal sleep, in medical terms, is that which provides the individual with well-being or physical rest and physical and mental rest during the night "well slept", with recovery of energy that allows them to carry out the tasks of the next day. It is a vitally important behavior, but it is also fragile (Koo & Kim, 2013).

Our sleep and our health are highly linked. Sleep is a basic human need and is considered an important indicator of health and good quality of life at all ages (Anjarwala et al., 2020). Sleep is fundamental for several human physiological functions, including

learning ability, memory consolidation, neurocognitive functions and mental health (Goweda et al., 2020). (Goweda et al., 2020; Okano et al., 2019; Toscano-Hermoso et al., 2020).. Several factors can affect sleep quality, such as work, lifestyle, health environment and stress(Anjarwala et al., 2020; Kluthcovsky et al., 2017)..

Sleep patterns vary throughout life, with the most important changes occurring in the first years of life as well as during the transition phase from childhood to adolescence. These changes are partly the result of complex changes that occur in the circadian system and in the maturation of the brain. In addition, daily routines, environmental changes and responsibilities change over time and can contribute to altered sleep patterns. (Anjarwala et al., 2020; Suardiaz-Muro et al., 2020)..

Students with less total sleep time have increased daytime sleepiness, daytime fatigue, behavioral problems, decreased attention during class and consequently, decreased academic performance. (Duarte et al., 2022). Poor sleep quality is also associated with low academic performance. Students need 8 to 10 hours of sleep per night, but currently they sleep much less, constituting a growing concern in our society, since it can have several consequences on their health, development and performance (Anjarwala et al., 2020; Suardiaz-Muro et al., 2020)..

On March 2, 2020, the first two cases of infection with the novel coronavirus SARS-CoV-2, a virus that can cause severe respiratory infection and pneumonia, were confirmed in Portugal. Lack of sleep was already affecting millions of people before the coronavirus, and unfortunately, the pandemic has created a number of new challenges, even for those who previously had no problems sleeping due to work adaptation or distance learning. (Gupta et al., 2020).

The changes related to the COVID-19 outbreak have also affected the academic context. In fact, all universities have been confronted. Since March 2020, distance learning has sometimes replaced traditional face-to-face teaching. The massive use of technologies, resulting from the need for social distancing due to the COVID-19 pandemic, has demanded great flexibility from students and teachers in higher education. In addition, the confinement at home has compromised the possibility to fully experience university life, influencing academic study (i.e. uncertainties about cancellation, delays in activities and use of the digital platform) and limiting the ability to benefit from social support, which can play a crucial role in coping with the difficulties of the university environment. (Benham, 2021; Giusti et al., 2021; Marelli et al., 2021)..

Due to this situation, as a preventive measure, schools and universities were closed, which led to the suspension of face-to-face teaching and, consequently, to the alteration of the academic schedule. The emergence of new or worsening circadian rhythm disorders compromises students' sleep capacity and sleep-wake cycle, affecting their overall well-being and quality of life.

Confinement can reduce the level of physical activity and exposure to daylight, and increase stress levels due to social isolation (e.g. avoiding social contact with family and friends) and the inability to engage in satisfying activities. These changes can disrupt night-time sleep and increase the risk of mental health problems (Cellini et al., 2020).

In the current literature, there are studies that have assessed sleep behavior through brief questionnaires such as the Epworth Sleepiness Scale and the Pittsburgh Sleep Quality Index (Alotaibi et al, 2020; Benham, 2021; Bugueño et al, 2017; Cellini et al, 2020; Chagas Cardoso et al, 2009; Da Saúde et al, 2013; El Hangouche et al, 2018; Javaid et al, 2020; Kluthcovsky et al., 2017; Maheshwari & Shaukat, 2019; Marelli et al., 2021; Md Zuki et al., 2021; Toscano-Hermoso et al., 2020; van der Heijden et al., 2018)..

In Portugal, the two questionnaires were adapted into Portuguese, the ESS by the Directorate-General for Health (DGS) and the PSQI by the University of Algarve.

The current COVID-19 pandemic has changed the routine of a large part of the population, in addition to affecting sleep quality and becoming a risk factor for the development of problems. Higher education students have been no different, with a decline in sleep quality observed during the pandemic. During university studies, many students study until late at night, which affects their quality of sleep, and this routine has worsened during the pandemic.

This study will be conducted in order to observe the effects of the pandemic caused by the SARS-CoV-2 coronavirus on the sleep quality and academic performance of ESALD students.

This study aims to encourage higher education students to create healthy sleep habits for the benefit of their physical and mental health and, consequently, to improve their academic performance.


## 2 OBJECTIVE

Conduct a literature search on how aesthetics in integrative oncology can contribute to the promotion of health, well-being and self-esteem.

## 3 METHODOLOGY

### 3.1 RESEARCH ETHICS

This study was submitted to the Ethics Committee of the Escola Superior de Saúde Dr. Lopes Dias, with the number 69/CE-IPCB/2022, having obtained a positive opinion. The Declaration of Helsinki was also complied with by the entire research team.

### 3.2 POPULATION

This study was carried out at Escola Superior Dr. Lopes Dias, Castelo Branco and had a sample of 30 patients, who met the inclusion criteria, as students of Escola Superior de Saúde Dr. Lopes Dias, having at least 2 enrollments in the 2020/2021 degree curricular plan and being enrolled in a complete curricular plan and students who expressed their willingness to participate through Free and Informed Consent, to perform the online questionnaires of two validated questionnaires, Pittsburgh Sleep Quality Index and Epworth Sleepiness Scale, adapted for the study.

### 3.3 QUESTIONNAIRE

The Epworth Sleepiness Scale (ESS) is a scale that measures daytime sleepiness. The questionnaire assesses the likelihood of falling asleep on a scale of increasing probability from 0 to 3 for eight different situations that most people engage in during their daily lives, although not necessarily every day. The scores for the eight questions are added together. When the sum is in the range of 0 to 9, the result is considered normal, while if it is in the range of 10 to 24, the result is not considered normal and determines that the patient should see a medical specialist. For example, scores of 11 to 15 indicate the possibility of mild to moderate sleep apnea. A score greater than or equal to 16 indicates the possibility of severe sleep apnea or the presence of narcolepsy (Chagas Cardoso et al., 2009; Javaid et al., 2020)..

The Pittsburgh Sleep Quality Index (PSQI) is a self-completed questionnaire to assess sleep quality over a one-month interval. The measure consists of 19 individual items, which designate 7 components that generate an overall score. Each item is weighted based on a 0-3 interval scale. The overall PSQI score is then calculated by summing the scores of the seven components, providing an overall score from 0 to 21, with lower scores denoting healthier sleep quality. This index was developed by researchers at the University of Pittsburgh.

The aim was to create a standardized sleep questionnaire for quicker and more practical use by clinicians and researchers, which can be used by various populations. The results obtained in each component provide information on subjective sleep quality, sleep latency (i.e. the time it takes for the person to fall asleep), sleep duration, habitual sleep efficiency (i.e. the percentage of time the person sleeps in bed), sleep disturbances, medication and daytime dysfunction (Alotaibi et al., 2020; Bugueño et al., 2020).(Alotaibi et al., 2020; Bugueño et al., 2017)..

Students will also have to answer some questions about their academic career, at the end of which the average of the grades obtained at the end of the 2020/2021 school year and previous years will be evaluated for further analysis.

## 3.4 STATISTICAL ANALYSIS

Finally, a statistical analysis of all the results was carried out using the SPSS® statistical program, with a subsequent relationship between the variables.

## 4 DEVELOPMENT

The sample consisted of 30 individuals, aged between 20 and 32 years, with a mean age of $22.87 \pm 2.432$ years.

Of these 30 individuals, 21 were from the 4th year (70%) and 9 were from the 3rd year (30%). Of these, 8 were male (26.7%) and 22 female (73.3%).

The average number of hours slept before the pandemic was 6 hours and 42 minutes $\pm$ 1 hour and 9 minutes, with the minimum hours of sleep being 4 hours and the maximum 8 hours.

The average number of hours of sleep during the pandemic was 6 hours 48 minutes $\pm$ 1 hour 28 minutes, with a minimum of 4 hours of sleep and a maximum of 9 hours.

Table 1: Table of the relationship between sleep hours and the year before the pandemic

| | | Hours of sleep before the pandemic | |
| --- | --- | --- | --- |
| | | <7h | 7-9h |
| | | Score (%) | Score (%) |
| Year | 3rd year | 6 (46,2%) | 3 (17,6%) |
| | 4th year | 7 (53,8%) | 14 (82,4%) |
| | | $p=0,091$ | |

Table 2: Table of the relationship between sleep hours and year during the pandemic

| | | Hours of sleep during the pandemic | |
|---|---|---|---|
| | | <7h | 7-9h |
| | | Score (%) | Score (%) |
| Year | 3rd year | 5 (45,5%) | 4 (21,1%) |
| | 4th year | 6 (54,5%) | 15 (78,9%) |
| | | *p=0*,160 | |

This study aimed to assess how the pandemic has affected the sleep quality of university students and the effects of sleep changes on the physical, cognitive and emotional health of university students.

It is important to note that the pandemic has brought more threats to the sleep hygiene of students, as life has become mostly digital and with restrictions on one's daily routines. The population has undergone many changes that have led to increased screen times. With this study, it was possible to show that university students had several difficulties in relation to sleep, such as delay in falling asleep, increase in the number of hours of sleep per day, poor sleep quality, use of sleep medication, sleep-related problems and interference in activities performed during the waking period and increased need for daytime naps. (Vieira-Santos et al., 2022).

There are previous studies that have already highlighted that before the pandemic, the prevalence of sleep quality problems and sleep disorders in university students is high. (Araújo & Almondes, 2012).

Probably, many of the challenges brought by the pandemic may have been caused by the fact that university students had to adapt to this way of teaching and some did not have the resources to do so, leading to increased levels of stress, anxiety and depression. These psychological changes manifest themselves through different visible symptoms, including changes in sleep quality and insomnia, thus showing that mental health and sleep quality are directly related.

Increased use of electronic devices, screen time and decreased and/or no physical exercise have been direct consequences of COVID-19 restrictions. Screen exposure has been shown to correlate with poor sleep quality and decreased physical activity can also affect sleep quality (Adelantado-Renau et al., 2019).

As we can see, in this study, there was a large percentage of students who sleep the recommended number of hours to have the feeling of a "well-slept" night, predominantly from the 4th year, before the pandemic, which may be related to the lower number of teaching hours compared to the 3rd year. During the pandemic, there was a decrease in the number of students who slept between the recommended hours, which

may be related to the adaptations that occurred during the pandemic, which is corroborated by the study by Vieira-Santos et al., 2022.

## 5 FINAL CONSIDERATIONS

As we can see, in this study, there was a large percentage of students who sleep the recommended number of hours to have the feeling of a "well-slept" night, predominantly from the 4th year, before the pandemic, which may be related to the lower number of teaching hours compared to the 3rd year. During the pandemic, there was a decrease in the number of students who slept between the recommended hours, which may be related to the adaptations that occurred during the pandemic, which is corroborated by the study by Vieira-Santos et al., 2022.

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